

STATUS OF FOREST INSECTS  
IN THE INTERMOUNTAIN AND NORTHERN ROCKY MOUNTAIN STATES  
DURING 1960

The detection and evaluation of forest insect populations in the territory covered by the Intermountain Forest and Range Experiment Station is a task of considerable magnitude. Cooperation received from Federal, State and private land managers enables the entomologists to extend their effectiveness in obtaining and organizing data to develop more complete knowledge of the status of infestations over wide areas year by year. This information is essential to land managers who are confronted with protection problems.

Infestations of various forest insects in the Intermountain and northern Rocky Mountain states were still numerous and quite severe during 1960. This is especially true in U.S. Forest Service Region 4<sup>1/</sup> covering the Intermountain area.

It is of interest to note that in the Northern Region, damage from bark beetles remains relatively low, while in the Intermountain Region several species are causing extremely heavy losses. Spruce budworm continues as a primary defoliator species in Montana and Idaho. The larch casebearer continues its spread in northern Idaho and eastern Washington, and severity of feeding has increased greatly near St. Maries, Idaho, where it was first discovered in 1957. This report presents brief statements on the major and minor pests as determined during surveys in 1960.

BARK BEETLES

Mountain pine beetle

The mountain pine beetle, Dendroctonus monticolae Hopk., is at times a major pest of all important pine species in the Intermountain and northern Rocky Mountain states. This insect has been infesting old-growth white pine stands in the Clearwater National Forest, in Idaho, since 1934. During the period 1952 to 1960, mortality caused by this beetle has averaged about 2-1/2 percent of the stand annually. Evaluation of some infestations on this forest, during 1960, resulted in a prediction that approximately 40 percent more trees may be attacked in 1961 than were killed in 1960. Localized infestations of mountain pine beetle have also been reported within the mature white pine type in the Coeur d'Alene, St. Joe, and Kaniksu National Forests in Idaho and the Kootenai National Forest in Montana.

<sup>1/</sup> Intermountain Region and Northern Region are synonymous with U.S. Forest Service Regions 4 and 1.

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Mountain pine beetle activity in lodgepole pine stands in the northern Rocky Mountain states is still at a low level. Widely scattered, single infested trees and small groups were reported on about 17,300 acres of this host type on the Kootenai National Forest in Montana. This light infestation pattern has been characteristic for a number of years. Along the Madison mountain range, in the Gallatin National Forest, where over 50,000 acres of lodgepole pine are badly infected by the comandra rust, there is evidence of a light infestation of mountain pine beetle. The species has infested small groups of white bark pine almost annually in drainages surrounding Mt. Washburn in Yellowstone National Park.

In the Intermountain region, mountain pine beetle infestations continue at a high level in many lodgepole pine stands in northern Utah, eastern Idaho, and western Wyoming. In 1959, 22 infestation centers were reported in lodgepole pine stands of the region. Twenty of these areas were treated during the 1960 season and nearly all will need additional control work in 1961. This year, 10 new infestations were found which were mostly in close proximity to older known infestations.

Control treatment has been effective in northern Utah during the past 3 years in reducing the over-all beetle population, and has materially reduced the size of epidemic areas on the Wasatch control project which has been and continues to be the most serious of our outbreaks. In areas where treatment has not yet been started, population buildup has been tremendous and attack intensities of 20 trees or more per acre are not uncommon. Mountain pine beetle activity has been observed on the Ashley National Forest since 1956. Several low level infestations during the period have not developed into epidemics and consequently have been left to run their course, while treatment was undertaken in other areas.

Infestations on the Teton National Forest and Grand Teton National Park, in Wyoming, are still increasing rather rapidly.

An outbreak on the Sawtooth National Forest in southern Idaho has been reduced materially by direct control methods. Infestations on the Targhee National Forest and adjacent lands continue to show high population density in epidemic centers.

An infestation of mountain pine beetle in second-growth ponderosa pine on the north shore of Lake Tahoe, in Nevada, has been present for some years. This outbreak at Crystal Bay showed little change in the beetle population density between 1959 and 1960. This private property has been purchased by the Crystal Bay Development Company and they intend to erect houses, shopping centers, and other facilities. The new owners are concerned about the infestation and are taking steps to reduce the loss of timber resulting from beetle attacks. Briefly, the program consists of

removing infested trees with a general thinning of the stand in the areas being developed. There is a possibility that removal of infested trees will be undertaken in those areas not scheduled for immediate development.

Mountain pine beetle populations in second-growth ponderosa pine near Atlanta, Idaho, have been reduced to a low level by two years of cut, deck, and burn procedures. This work has been very effective but some maintenance control might be required in 1961.

#### Engelmann spruce beetle

Infestations of Engelmann spruce beetle, Dendroctonus engelmanni Hopk., decreased in northern Idaho and western Montana in 1960. Current outbreaks are those that have persisted in the perimeter of areas that were clear-cut during the past few years to control the beetle on six national forests. Salvage operations have been planned for the removal of the presently infested trees.

Several serious outbreaks have developed in southern Idaho, Utah, and western Wyoming during the past few years. Logging and chemical treatments were undertaken to reduce the losses and prevent expansion of the infested areas. In 1959, 9 infestations of Engelmann spruce beetle were reported in the Intermountain region. Control operations were undertaken against 6 of these infestation. The remaining 3 were small, showed no increasing trend, and direct control was not necessary.

An infestation in standing trees, culls, and slash on the Payette National Forest in southern Idaho has been reduced by use of chemicals and trap trees. However, spruce logs from a road clearance project became heavily infested in 1959. Trap logs were placed and absorbed some of the beetle population in 1960. It appears that there are enough beetles remaining in this situation so that standing trees might still be attacked if the population is not reduced next season.

Since 1958, an infestation of spruce beetle has been present on Federal, State, and private lands in southern Utah, including parts of the Manti-LaSal National Forest. The infestation started originally in culls, stumps, and long butts where spruce stands were being selectively cut and logged on State and private lands. Since then, logging and chemical control measures have substantially reduced the infestation, but this year selective logging operations were continued on State land, resulting in a considerable amount of slash which is on the ground at the present time. If the slash and cull material is not disposed of properly Engelmann spruce beetle populations could build up rapidly and cause another serious epidemic.

A serious infestation of Engelmann spruce beetle was discovered in 1958 on the Uinta, Ashley, and Wasatch National Forests. At the time, epidemic populations of the beetle were present over about 100 square miles.

Immediate control action was undertaken to prevent further destruction in this valuable spruce stand. All areas of infestation were effectively treated by logging to remove infested material from the forest, or by application of toxic chemicals. Thus, an extremely destructive outbreak was brought under control by prompt action and efficient procedures so that only maintenance control should be necessary in 1961.

A very serious infestation of spruce beetle has persisted in the upper Green River area on the Bridger National Forest, in Wyoming, since 1955. A combination of control measures consisting of logging, use of trap trees, and toxic chemicals has been directed against this outbreak. Remaining populations still are a threat to all spruce stands immediately adjoining the main body of the infestation, and it appears that unless populations are reduced rapidly, tremendous losses of Engelmann spruce may follow.

#### Black Hills beetle

Populations of Dendroctonus ponderosae Hopk., in ponderosa pine stands of southern Utah have shown a definite downward trend for the past several years. Evaluations this year show that, for the most part, the downward trend continues. During the past few years, ponderosa pine stands in southern Utah have suffered severe drought conditions and past records have shown that Black Hills beetle outbreaks often coincide with dry periods. Continued surveillance to detect new infestation centers is planned, and some additional control on the few remaining hot spots may be advisable.

#### Douglas-fir beetle

Douglas-fir forests in the Northern Rocky Mountains have suffered periodically from outbreaks of Dendroctonus pseudotsugae Hopk. These have occurred about every 9 years and are quite serious for 3 to 4 years. The last major outbreak in the Northern Region occurred during the period 1950 to 1952, and it is estimated that 333 million board feet of Douglas-fir on 973,000 acres was destroyed. The presence of red tops throughout much of the Douglas-fir type this season would indicate that another outbreak is developing. Infestations are scattered within areas that total more than 400,000 acres on six national forests and other lands.

Large volumes of Douglas-fir are killed by the Douglas-fir bark beetle each year in the Intermountain region. This bark beetle is presently quite active throughout the region. Douglas-fir stands on the Sawtooth National Forest in Idaho, and the Dixie National Forest in Utah, are particularly hard hit, with many large epidemic centers present. On the Targhee, Boise, and Payette National Forests in Idaho, and on the Wyoming Division of the Bridger and the Teton National Forest in Wyoming, damage is less than on the Sawtooth and Dixie, but many infestation centers are present. Losses from Douglas-fir beetle are expected to continue at about the same level next year.

### Fir engraver beetle

Many thousand true firs are killed annually throughout the Intermountain region by the fir engraver, Scolytus ventralis Lec., or Dryocoetes confusus Sw. The majority of the affected trees occur in rather inaccessible areas and are of relatively low economic value. Heavy broods of Scolytus ventralis Lec. were found in pole-sized grand fir near St. Maries, and a light infestation in small grand fir near Clarks Fork, Idaho.

### Pine engraver beetle

Ips beetle do not appear to be a serious problem at the present time. The Oregon pine engraver top killed some mature trees and infested patches of reproduction over 200 acres on the Custer National Forest in Montana. The Kootenai National Forest in Montana reported infestations on about 200 acres after Ips emerged from piles of pine slash. A few large groups of pole size ponderosa pine were infested on private land near Plains, Montana. The Kaniksu National Forest in northern Idaho reported some mature ponderosa pine killed that contained broods of Ips emarginatus.

### Western pine beetle

Outbreaks of Dendroctonus brevicomis Lec. increased in number in northern Idaho and western Montana during the year. While no serious outbreaks were reported, infested trees were more noticeable in several areas. An estimated 100 trees were attacked west of Rexford, Montana, and in the Meadow Creek drainage of the Lolo National Forest beetle broods are currently infesting mature pine. Small groups of infested ponderosa pine were reported on the Kaniksu National Forest in northern Idaho and on private land in the Thompson Lakes area west of Kalispell in Montana. In the rest of the areas under observation, the western pine beetle appeared to be at a relatively low level.

## DEFOLIATORS

### Spruce budworm

Many infestations of Choristoneura fumiferana (Clem.) throughout Montana continued in epidemic status. There were small areas where defoliation in 1960 had decreased since last year, but these were an insignificant part of the total area infested. Surveys showed that there was no appreciable increase in infested acreage in Montana in 1960, which approximated 3-1/2 million acres. Evaluation of outbreaks during the year indicates that much the same infestation conditions prevailed in 1960 as in 1959. Small reductions in severity of defoliation and moth populations between 1959 and 1960 were revealed during evaluations, but probably are not significant. It is believed that host tree damage from the budworm will continue in 1961 at about the same level as that in 1960 unless populations are reduced by natural factors that cannot be predicted.

Three years have elapsed since the last large-scale budworm control project in southern Idaho. Spruce budworm remains the most important defoliator in the area but population levels are generally lower than have been observed during the past several years. Populations have decreased generally in southern Idaho, with two exceptions: the Challis and Targhee National Forests. This decrease has occurred in either of two ways: The entire population within an infested area decreased or larger expanses of infestation have become broken up into smaller areas containing lesser populations, with occasional hot spots. Only on the Targhee Forest has an older infestation shown an increasing trend, and this within an area of approximately 4,000 acres. A new infestation of about 150,000 acres is developing on the Challis National Forest. Medium to heavy defoliation was noted on about a third of this area. Total acreage infested in southern Idaho totals approximately 500,000 acres with about 20,000 acres being rated as heavy, and 417,000 acres as light.

#### Tussock moth

Tussock moth infestations on various brush and tree species continued in scattered locations throughout the Intermountain region. Virus diseases, either occurring naturally or applied as a control measure, have in most cases effected some degree of control in each infestation.

Approximately 50 square miles of brush surrounding the Boise Basin Experimental Forest and Town Creek Plantation, in Idaho, were infested by tussock moth suspected to be Notolophus antiqua (L.). A virus within the Town Creek Plantation area, reported in 1959, reduced the population considerably. However, reinfestation occurred by population movement during the early larval instars from large surrounding infested areas. Evaluations this year showed an increase in numbers of egg masses of about 4 to 1 over last year. The greatest increase is expected to occur within the pine planting areas on the Experimental Forest. The epidemic within the Town Creek Plantation will probably continue at the same level in 1961. The infestation within this area has been so intense that larvae began defoliating the young ponderosa pine after completely stripping the brush species.

An infestation of tussock moth, believed to be Notolophus antiqua, on bitterbrush near Carson City, Nevada, was included in an experimental test with virus in 1959. The virus caused considerable mortality in the area of treatment and apparently remained in the population into 1960, when the species was practically eliminated in the test area.

A tussock moth infestation on white fir, about 5,000 acres in size, was discovered on Wheeler Peak, in Nevada, late in 1959. A pilot control test was conducted using 3 concentrations of virus, with 2 replications, applied by airplane. The formulation consisted of virus material, corn syrup, water, and Leucophor C. Leucophor C, a fluorescent tracer, proved highly effective in determining spray coverage. Results of the test showed an over-all average of 62 percent reduction in the population due to virus. Higher concentrations were more effective than the lighter ones.

A tussock moth infestation on white fir on Highland Peak, near Pioche, Nevada, was discovered early in 1960. The insect had been at epidemic level for 3 to 4 years and, at the time of the spring evaluation, it appeared that the epidemic would continue. However, data obtained in late fall revealed a higher than average egg parasitism and predation. Examination of remains of mature larvae showed that a virus was becoming active. Evaluation of these natural factors operating to reduce populations indicates that the infestation may subside rather rapidly and that direct control will not be necessary.

#### Larch casebearer

The larch casebearer, Coleophora laricella (Hbn.), has spread over practically all of northern Idaho and parts of eastern Washington since its discovery at St. Maries in 1957. Although specimens of this pest can now be found in an area well over 8,000 square miles in size, visible defoliation has thus far been confined to the 532 square miles reported during 1960 in the vicinity of St. Maries, Idaho, and the adjacent St. Joe National Forest. Most of the defoliation centered in western larch stands on private land. Defoliation was very heavy this year, but despite this no tree mortality has occurred as yet even where successive annual defoliation has been observed. The infestation appears to be increasing, both in area and in severity of damage. Approximately 2,500 Agathis pumilus (Hymenoptera: Braconidae) adults were released as casebearer parasites in 5 locations near St. Maries in June. These parasites were received from the Forest Insect Laboratory of the Northeastern Forest Experiment Station at New Haven, Connecticut. Since the casebearer is relatively new to the area, and is attacking a different host than in the East, there is considerable interest in the possibilities of initiating biological control by the introduction of this parasite.

#### Sawflies

Two species of sawfly, only recently determined as Neodiprion fulviceps complex, and N. nanulus contortae have defoliated overstory lodgepole pine in ponderosa pine trees since about 1958 in the Little Rocky Mountains near Zortman, Montana. Some mature trees died following defoliation. Evaluation of this outbreak made this year showed that the infestation is decreasing. Examinations in June indicated that 68 percent of the sawfly eggs found at the time were nonviable, and a scarcity of cocoons in the infested area in August was prime evidence in the prediction.

The larch sawfly, Pristiphora erichsonii (Hartig.), was still active in the Blackfoot River drainage, northeast of Missoula, Montana. The host tree damage was nominal.

Light defoliation by the western larch sawfly, Anoplonyx occidentis Ross, was evident in pole size western larch trees, west of Noxon, Montana.



A general decrease in population of sawflies occurred in 1960 in the Intermountain region. The lodgepole pine sawfly pupal population was about the same as in 1959. A leveling off of the rising trend noted over the last 3 years is apparent. The sawfly infesting Douglas-fir on the Sawtooth National Forest and adjacent Bureau of Land Management lands in Idaho peaked in 1960. Defoliation dropped from greater than 90 percent to less than 25 percent and pupal counts were approximately half of that recorded the previous year. Collection of mature larvae indicated a virus occurring naturally in the population.

The pinyon pine sawfly, Neodiprion eduliculus Ross, near Pioche, Nevada, decreased rapidly this year. Unseasonal snow storms and low temperatures reduced the population to the point that pupal density was very low.

#### Pandora moth

The pandora moth, Pandora coloradia Blake, is active on about 15,000 acres of lodgepole pine in northeastern Utah. This year, 1960, was the year of egg hatch and small larvae that produce little defoliation before hibernating. The population density is such, however, that heavy defoliation, with possible tree mortality, might occur in 1961.

#### Needle midge in Douglas-fir

A needle midge, Contarinia sp., appeared in outbreak status in 1950 between Newport, Washington, and Rexford, Montana. Defoliation of Douglas-fir trees was so severe that in 1952 the Christmas tree harvest in this area suffered an estimated \$1 million loss. Infestations of this midge appeared again in 1960, and were found throughout the Douglas-fir type in Montana. Heavy midge populations were reported and Christmas trees ready for harvest were badly damaged in the Lolo and Kootenai National Forests and in the Flathead Indian Reservation in Montana.

#### Pine resin midge

The epidemic of resin midge, Retinodiplosis sp., that caused severe damage to lateral branch tips in numerous ponderosa pine plantations over the Northern Region in 1959 subsided in 1960. Very little current "flagging" of branch terminals was noticeable in an area of previous heavy damage in 1959 near Rexford, Montana. Only 300 acres on the Kaniksu National Forest were damaged in 1960, a considerable reduction over the acreage damaged in 1959.

#### Lodgepole needle miner

The lodgepole needle miner, Recurvaria milleri Busck., has increased in severity in the lodgepole pine forests of the Intermountain region for the last 4 years. Epidemic centers now exist on 4 national forests: Targhee Sawtooth, and Caribou forests in Idaho; and the Bridger forest in Wyoming.



Infestations are considered epidemic over 200,000 acres at the present time. The largest infestation is on the Targhee National Forest in the center of a large commercial stand of lodgepole pine. Defoliation of year-old needles has exceeded 30 percent for the last 3 years over a majority of this infestation. This year an infestation of the lodgepole needle miner was reported near Zortman in Montana.

#### Pine tip moth

Infestations of a pine tip moth, Rhyacionia sp., have persisted for a number of years in the understory ponderosa pine stands on the Custer National Forest in Montana and South Dakota. Heavy damage occurred in 1959 in the Long Pines area. Examinations made during two periods in 1960 indicated a rather sharp reduction in this infestation, which is now at a very low level.

#### Pine shoot moth

A light infestation of pine shoot moth, Eucosma sp., was reported in the Libby, Montana area this year. During 1959 there had been some killing of terminal and lateral shoots of second-growth ponderosa pine, but little evidence of current feeding was found in 1960.

#### Aspen leaf miner

Populations of aspen leaf miner, Phyllocnistis populiella Chamb., have been active in western Wyoming and eastern Idaho for the past 10 to 13 years, and are continuing to inflict extensive damage to aspen stands. Mortality of aspen stands is becoming increasingly evident.

#### Fir needle miner

A serious outbreak of fir needle miner, Epinotia meritana Hein., in southern Utah, was brought under control in 1957 by aerial application of Malathion. Heavy parasitism of this species at that time also contributed to the reduction of this outbreak. In 1960, a definite increase in needle miner populations was observed. While this population cannot be considered as epidemic, it is a warning that the species might build up to epidemic level in the next few years.

#### Spruce mealybug

Populations of the spruce mealybug, Puto sp., continue at epidemic level within Engelmann spruce stands in southern Utah. The infestations occur in three separate areas, totaling approximately 60,000 acres. Mortality of spruce reproduction is noticeable within the older infestations.

#### Mealybug

Infestations of a mealybug in true firs on the Payette National Forest have been reported for several years. Damage to the present time has been of no significance.

#### Woolly pine aphid

An aphid, Pineus sp., has been under suspicion, since 1958, of contributing to a needle blight on western white pine throughout its range in northern Idaho and western Montana. The relationship of this aphid to the blight is still unknown. Both the blight and aphid populations have decreased considerably around Clarkia, Idaho, this season.

#### Cooley spruce gall aphid

A heavy population of Adelges cooleyi Gill., was reported on needles of Douglas-fir east of Seeley Lake, Montana during 1960. The aphid is still abundant on ornamental spruce trees near Missoula, Montana.

#### Douglas-fir bark moth

Damage by larvae of Laspeyresia fletcherani (Kerf.), has been increasing for the past few years in Christmas tree stock growing on the Kootenai National Forest.

#### Western balsam bark beetle

A small infestation of the western balsam bark beetle, Dryocoetes confusus Sw., was discovered attacking subalpine fir trees near Mt. Washburn in Yellowstone National Park in Wyoming.